

## ARTICLE

# Online social network contacts as information repositories

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## Abstract

Social networks have existed since ancient times. With advances in technology, they have evolved into modern online social networks. The explosion of online social networks has had a big impact on society in general and on education in particular. Most university students are now members of social networking sites and spend several hours a week online. Some sections of society, such as parents and teachers, are worried about the effect that this may have on students' academic work and personal lives. However, according to George Siemens' connectivism theory, online social network contacts represent a potential and valuable source of information. This study seeks to identify the factors that influence whether a contact on an online social network becomes a source of information in a learning initiative. The research\* uses a qualitative approach, and was carried out in a private higher education institution on a group of 21 graduates who had recently finished the same course, and

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on 13 university lecturers. The results show that the factors affecting whether online social network contacts become sources of information are: knowing about the contact; knowing what the contact knows; social closeness; the contact has a certain standing; knowing the contact in person, and; the contact is accessible.

## Keywords

online social networks, e-learning 2.0, virtual ethnography, information repositories

## *Contactos de redes sociales en línea como repositorios de información*

### Resumen

*Las redes sociales han existido desde la Antigüedad. Con el avance tecnológico, han evolucionado hacia las modernas redes sociales en línea. La explosión de estas últimas ha ido acompañada de importantes impactos sociales, incluido el del ámbito educativo. Un gran número de estudiantes universitarios pertenecen ahora a alguna red social y pasan varias horas a la semana en ella. Algunos sectores de la sociedad, como padres de familia y profesores, están preocupados por el impacto negativo que esto puede tener tanto en su actividad académica como en su vida personal. Sin embargo, según el conectivismo de George Siemens, los contactos de una red social en línea representan una potencial y valiosa fuente de información. En este estudio se buscó identificar los factores que favorecen que un contacto de una red social en línea se convierta en una fuente de información, ante una iniciativa de aprendizaje. Se presenta una investigación, de naturaleza cualitativa, que se realizó en una institución privada de educación superior, con un grupo de 21 estudiantes recién egresados de una carrera en particular y 13 profesores universitarios. Los resultados demuestran que los factores que favorecen que un contacto se convierta en fuente de información en una red social en línea son: que se tenga conocimiento sobre el contacto, que se conozca lo que el contacto sabe, que se tenga cercanía social, que el contacto tenga cierto prestigio, que se conozca al contacto en persona y que sea accesible.*

## Keywords

*redes sociales en línea, e-learning 2.0, etnografía virtual, repositorios de información.*

## Literature review

### Online social networks

Social networks have existed for a long time; however, some people believe that these networks have been somewhat weakened by technological advances, such as the computer and the Internet. Morris (2006) explains that, as tribal beings, we have always needed to compensate competitiveness with cooperation. According to this author, as well as the will to triumph, we have also inherited the will to cooperate, not on moral grounds, but rather as part of human nature. Cooperation, according to Morris, is a defence mechanism against the failure of the group to which we belong. This primitive behaviour is still evident today.

With technological advances, ancient tribes have also evolved in modern social networks. New technologies should not only be understood as information technologies, but also as communication technologies. Their evolution always brings with it a series of social changes and behavioural changes that can have a much greater impact on society (Burbules & Callister, 2000). This would seem to be the case with online social networks, where tools such as Facebook and Twitter have millions of users all over the planet, with numbers increasing daily. The field of education has not escaped its impact; according to Contardo (2008), up to 70% of higher education students starting courses in 2010 already belong to a social networking site.

Online social networks consist of information systems accessed via the Internet. They bring millions of people from across the globe together, all of whom have mutual relationships (Kazienko & Musial, 2006). According to Ellison, Lampe and Steinfield (2007), social networking sites such as Facebook, MySpace, Friendster and Hi5, allow people to introduce themselves, organise their social networks and establish new relationships or keep up relationships with others. These sites can be orientated towards different contexts, such as work, starting romantic relationships, finding new friends, or connecting with people with shared interests.

Social networking sites are Web 2.0 applications or social software. Even though it does not yet have a generally accepted definition, by social software we mean software that has a collaborative element, which facilitates the organisation and shaping of communities, social interaction and feedback between individuals. This ensures that a horizontal structure is achieved, where no relationships are based on superiority or inferiority. Social software allows for a structured mediation of opinions between people in a centralised or self-regulating manner (Kollányi, Molnár & Székely, 2007).

These principles are in line with modern educational theories such as constructivism and connectivism, making Web 2.0 applications attractive to students and teachers. Wikis, blogs and social bookmarking are now commonly used in learning. The popularity of Web 2.0 is growing along with its applications (Borau et al., 2008). For McLoughlin and Lee (2008), the advent of Web 2.0 urges us to reflect on the way that social software tools could break with industrialised learning models, and evolve towards another model based on students' individual achievements based on collaboration, online communication and interaction.

The Web 2.0 concept and the tools available can transform the learning style of new generations in the computer age. While students have traditionally learnt by reading books and attending classes in person, the use of Web 2.0 tools allows the teacher to explore new teaching methods and go beyond the barriers of space and time for learning (Allen, 2008; Levy, 2009; and Shihab, 2008).

## Connectivism

Siemens (2004) introduces the concept of connectivism applied to learning and proposes a new learning theory as an alternative to the contemporary theories of behaviourism, cognitivism and constructivism. This author claims that the three most commonly used learning theories in the creation of learning environments were developed prior to the impact of technology on learning. According to Siemens, technology has reorganised how people live, communicate with each other and learn. The learning needs and the theories that describe learning principles and processes should take into account the underlying social environment.

Brown (2006) asserts that currently, the vast majority of education initiatives are based on the constructivist paradigm. However, given the impact of ICTs in education, the author considers the need to adopt new learning paradigms. Connectivism is a theory that has emerged to describe the features of contemporary learning, a social interconnected learning, based on communities (McLoughlin & Lee, 2008).

With the inclusion of technology and the concept of connectivity, learning theories are beginning to gravitate within the orbit of the digital era. The basic premise is that it is not possible to experience in person or individually acquire all the learning needed to resolve current problems. Stephenson (as quoted by Siemens, 2004) postulates that experience is no longer considered to be the best teacher of knowledge. Since it is not possible to experience everything, other people's experiences and people themselves become substitutes for knowledge. "I store my knowledge in my friends" is an axiom for collecting knowledge through collecting people (Siemens, 2004). This axiom gives us an insight into the importance of network contacts in connectivism. In fact, according to McLoughlin and Lee (2008), in connectivism, learning is the process of creating connections between the nodes that make up a network, which coincides with the way that people socialise and interact using Web 2.0 tools on social networking sites. A review of these concepts confirms the importance that connectivism attaches to network contacts for learning.

The importance of social networks originates in the fact that: information is produced very quickly; it is hard to acquire the multidisciplinary knowledge required for problem-solving, and; information and communication technologies make it possible to stay in touch with other people. The contacts in a social network, according to connectivism, represent potential information repositories. According to Johnson (2004), studies on human behaviour almost universally show that when searching for information, people choose other people as primary sources of information ahead of any other kind of repository. This preference is explained by the fact that, as sources of information, people are usually more accessible and easier to consult than others, such as printed sources. Johnson

employed the theory of social capital and social network analysis to study the factors associated with choosing people as sources of information. The results of that research suggest that people deliberate over who to choose as a source of information, and that the choice is not always based on the one requiring the least amount of effort. In other words, the research suggests that other factors come into play when choosing somebody as a source of information.

Borgatti and Cross (2003) propose a formal model of information seeking in which the probability of seeking information from another person is a function of (1) knowing what that person knows; (2) valuing what that person knows; (3) being able to gain timely access to that person's thinking, and; (4) perceiving that seeking information from that person would not be too costly. The authors tested their model in two different organisations and they deduced that the first three variables mentioned above are the most predictive of information-seeking behaviour. The cost, even though it emerged as an important factor in a prior qualitative study by the same authors, was not statistically significant in the new study.

The studies carried out by both Johnson (2004) and Borgatti and Cross (2003) were based on face-to-face social networks. Also, neither of the studies were carried out in learning environments; Johnson's was carried out among the residents of Ulan Bator, a city in Mongolia, while Borgatti and Cross's was carried out in pharmaceutical companies. In the field of education, it can be seen that many teachers are joining social networking sites with a view to keeping in touch with students in the hope that this promotes learning. The aim of this research project was to study this phenomenon. The specific objective was to identify the factors that affect the probability of a contact on a social networking site being contacted to seek information and promote learning.

## Methods

In order to identify the factors affecting the probability of a contact on a social networking site being contacted to seek information and promote learning, a naturalistic methodology was chosen, since it was important to study the experiences, values and beliefs of the participants in a "natural" way. In this kind of research, the data emerges and develops; the results are not premeditated (Lincoln & Guba, 1985). According to Creswell (1994 and 2008), one of the advantages of qualitative research is the possibility of getting a holistic understanding of the phenomenon under investigation.

Different methods were employed for collecting data according to the profile of the participants. In the first stage (Study 1) a virtual ethnographic approach was used to observe the participation of university students on social networking sites. Based on the methodology of Spradley (1980), a process of online participant observation was employed. In addition, ethnographic interviews were carried out to support the information gathered during the observation. In the second stage, (Study 2), focus and interview groups were designed to collect information from university lecturers who were familiar with e-learning and the use of Web 2.0 tools.

## Study 1

The participants in Study 1 were 14 university students and seven recent graduates, all from the same course in a private university in northwest Mexico. The average age of the participants was 22.9 years; the youngest was 22 and the oldest 25. Six of the participants were women and 15 were men.

This group was selected because they had interacted with each other continually for about four years, and their interaction was expected to continue over the research period. In addition to attending university at the same time, this group kept in touch continually on Facebook.

Given that the participants were going to be observed on Facebook, it should be noted that there was a "secondary" group of participants, consisting of the contacts of each main participant in the study, whose interaction was also observed. The ethnographic interviews, for the purpose of clarification, were only conducted with the main group consisting of 21 participants. The observation period lasted six months, from January to June 2009.

## Study 2

A total of 13 university lecturers took part in Study 2. They were selected according to their experience and ability to use Web 2.0 tools, and also for their experience in e-learning programmes.

The first focus group was made up of a lecturer in Knowledge Management, a lecturer and director of the Educational Research and Innovation Centre, a lecturer in Information Systems and a lecturer in Basic Computing. A second focus group was made up of six participants attending an e-learning conference in Mexico. Whereas the first focus group was made up of experts in the field, the second group was made up of lecturers that, although not experts, were Web 2.0 tools users and had an interest in e-learning programmes.

The information obtained from the focus groups was completed by in-depth interviews with three key people who, because of conflicting engagements, could not take part in the focus groups. The interviews were held with a lecturer and co-ordinator from the Centre for Educational Technology and Innovation, with a lecturer in Intelligent Systems (who was also an expert in Web 2.0) and with another lecturer in Intelligent Systems.

# Results

## Study 1

In order to identify the factors affecting whether a contact becomes a source of information, data was collected from the observation of their interaction on Facebook and also from the interviews with the university students and recent graduates. The observation employed an ethnographic method (Spradley, 1980). A detailed analysis of the observations made can be found in Valerio (2010). An example of this kind of analysis can be found in Figure 1, which shows the potential interaction

between different participants in the study over a period of time. The graduates are represented by squares and the undergraduates by circles. The size of the geometric shapes depends on the number of contacts that each participant had at the time of the study. The figure shows marked differences between the participants in terms of the number of lines that converge in them: while some have a smaller number of possible information repositories, others have a greater number of connections and, consequently, a greater number of potential information repositories.

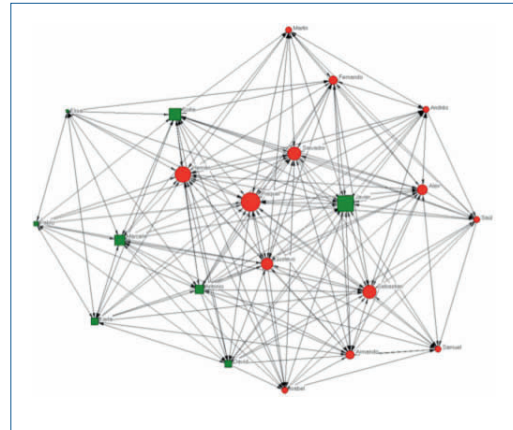


Figure 1. An example of the interconnections between participants on Facebook

By using the participant observation method, it was possible to identify those participants that tended to consult their contacts more in order to obtain information for a specific purpose. Once these participants were identified, they underwent an ethnographic interview to understand how they make decisions regarding who they consult and for what purpose.

The first group of findings corresponds to two main activities carried out by the participants to obtain information: (1) browsing the information shared by the contacts, and (2) consulting the contacts.

One way that people obtain information from their contacts is to look at their contacts' profile pages, similarly to looking at web pages. The contacts' profiles (their walls, notes and photographs) are not accessed in order to obtain specific information, but rather because they want an update on the lives of their contacts. On occasions, specific information is searched for in this way, for example, when you want to know one of the contacts' telephone numbers, the place where they studied, the names of their partners or any other information in their profiles. Users of these social networking sites know that they always have this option to obtain information about any member of their network. Similarly, users will occasionally access one of their contacts walls when they cannot recall some information from a conversation held with an individual contact.

Another way that people obtain information from their contacts is by consulting with them directly. When users of a social networking site have specific questions, they can make three kinds of consultations: individual, group or mass. Individual consultations are those where users decide to ask one of their contacts directly, via the chat, inbox or on the wall itself. Normally, the wall is used if it does not matter that other people see the consultation. This study concluded that 15% of the messages on the wall are individual consultations. Group consultations are those in which people use their contact lists to ask a question via their inbox, or by asking a question in a group or even in an event. This kind of consultation was not common in the study and was mainly observed in the events section. Finally, mass consultations are those where users ask a question to all their contacts by updating their status. This option is quite common, as it allows the user to ask a question that any of the contacts can see. The results of this study show that 6% of status updates are used to ask a question.

Table 1. Factors determining whether a contact is used as a source of information

FACTOR	CONCEPT	STUDENTS' COMMENTS ABOUT SOCIAL NETWORKS
Knowing about the contact	This refers to how much information is remembered about the profile of the person who may be consulted. Students mentioned that knowing things about the other person is a fundamental ingredient for confidence in asking them something. Perhaps it is not known exactly what the other person knows, but this knowledge can be inferred from where they work, their tastes, group memberships, etc. In this way, the contact's profile is a fundamental ingredient in determining whether a person is consulted.	<p>"The Facebook groups and communities that a contact belongs to are very relevant and help us to choose contacts with the same interests and therefore a greater probability of sharing learning."</p> <p>"The information available to their friends on their profile is very relevant, from what they studied, what they do, and their interests or, for example, the nicknames that they use."</p>
Knowing what the contact knows	This refers to what a contact thinks they know about what the person knows. In other words, somebody is consulted when it is believed that they know about the subject in question. Students even stated that they decided to accept a new contact on Facebook, not only for friendship, but also because they believe that their knowledge could be useful to them.	<p>"Having a friend on Facebook would depend on the skills that you know the other person has. You don't add new contacts just for the sake of it; you add them because you know things about the people, about their aptitudes, you know what they know."</p> <p>"[One of the most influential factors in choosing a contact to ask is] that you know that the other person has the knowledge you need or are seeking. That is to say, that you know in advance that the contact is good at something, or has a particular skill or special knowledge."</p>
Social closeness	This refers to how close the relationship is with the other person. In general, family members, partners and best friends are socially closest; then friends, teachers, etc. However, a relationship can be very close with a teacher and very distant with a first cousin. In any case, this closeness is reflected in the confidence that we have to consult a person, even when we do not hold much hope of what the other person may know.	<p>"[I decide who to ask] depending on how well I know them, regardless of whether they have the information I'm looking for, because they'll be able to put me in touch with the right person."</p> <p>"In my list of contacts, I might have people that I hardly know and I'm not keen on asking them this kind of thing."</p>
Standing of the contact	This refers to how much we value a person's knowledge. When looking for sources of information, their knowing about the subject is not the only thing that matters; the information seeker also considers what they really do know about it. The participants in this study commented that the standing of the contacts was related to the probability of consulting them.	<p>"I would look for the person of highest standing; for example a lecturer before a classmate."</p> <p>"In general we go to somebody we trust, who really knows the subject well."</p>
Knowing the contact personally	This refers to whether the contact is known to us personally. Although this factor was not mentioned much, it seems to be closely related to social closeness, since in general, somebody that is not known in person is at the lower end of the scale of social closeness. In any case, knowing the contact "face-to-face" seems to be an important factor when deciding who to ask.	<p>"First, you should know them personally; that is to say, not a virtual friend."</p>
Accessibility and availability of the contact	This refers to the fact that the contact is accessible and that the communication channel is kept open. Accessibility refers to the fact that the person in question can be contacted quickly. Social networking sites help, as they are a permanent communication channel, even though a response may not always be immediate. Their accessibility is not a synonym for availability. The latter refers to having the confidence that a person can be consulted and will want to reply.	<p>"How prepared they are to keep up relationships by these means, although Facebook facilitates interaction with people, it sometimes demands a lot of time, and not everybody is constantly online."</p>



A second group of findings corresponds to six determining factors in the choice of a contact as a source of information: (1) knowing about the contact; (2) knowing what that person knows; (3) social closeness; (4) the contact has a certain standing; (5) the contact is known personally, and; (6) that the person is accessible. Table 1 is a presentation of each factor, an explanation of the concept and some examples of participants' comments on the subject.

## Study 2

In a similar way to Study 1, the lecturers that participated also commented that the factors affecting whether contacts are used as sources of information were: the accessibility of the contacts; what they know about them; what they know about their knowledge, and; social closeness. However, the lecturers also believed that another important factor was the fact that they had been a classmate, and they did not refer to knowing somebody personally or their standing as significant factors, unlike the university students.

With regard to the accessibility of the contact, this was the factor that was mentioned most in both studies and emerged in the interviews. Another factor that came up a lot was knowing about the contact. According to one lecturer, consulting a contact is "obviously going to depend on the profiles that different people publish, (and on) which ones have the knowledge I require". At the same time, the results of Study 2 showed that knowing what knowledge contacts have and their social closeness are also fundamental factors for the lecturers.

There was general agreement on all of these factors, but, for the lecturers, the fact that a contact had been a classmate was also believed to be an important factor. This increased the probabilities of a contact becoming a source of information for a learning initiative. One lecturer made a comment to this effect: "many of my students, when they have a question, consult a classmate; they don't ask a student who isn't in their class". This is possibly limited to situations where the information sought refers to a specific class. However, considering all the classes that the participants in the study attend, and that being a classmate implies knowing each other personally, only the second factor is taken into consideration.

A comparison between the factors in both studies is presented in Table 2. The similarities and differences can be seen with regard to what the participants considered to be determining factors in

**Table 2.** Comparison between factors determining consultation with a contact (both studies)

STUDY 1. STUDENTS AND RECENT GRADUATES	STUDY 2. LECTURERS
Accessible	Accessible
Knowing about the person	Knowing about the person
Knowing what the person knows	Knowing what the person knows
Social closeness	Social closeness
Standing	
Knowing the contact personally	Classmate

deciding whether a contact on a social networking site becomes a source of information in a learning initiative.

## Discussion

The factors determining whether contacts become sources of information on a social networking site are that: (1) people know about the contact; (2) they know what the contact knows; (3) they are socially close; (4) the contact has a certain standing; (5) the contact is known personally, and; (6) the contact is accessible. It is important to mention that the participants in this study very often grouped all these factors under the word "trust"

An analysis of these factors shows that three of the factors employed by Borgatti and Cross (2003) in their model, have also come up in this study. It is useful to recall that the elements in their model were: (1) knowing what the other person knows; (2) valuing what that person knows; (3) being able to gain timely access to that person's thinking; and (4) perceiving that seeking information from that person would not be too costly. In this case, as in their study, the first three factors were highlighted as important factors.

With regard to knowing what the other person knows and being able to gain access to the other person, these factors emerged practically word for word in this study. In the case of valuing what the other person knows, this factor is considered to be equivalent to what has been termed as the "standing of the contact" in this research. In this case, the participants referred to standing in terms of the value attributed to what the contact knows.

However, in addition to these three factors, a further three factors came out in the study: knowing about the contact, social closeness and the kind of friendship (personal or virtual). Of these factors, the kind of friendship is considered to be closely linked to the kind of social network. Users of these social networks usually have a number of contacts that they do not know personally. According to the students participating in the research, this can be a factor affecting whether a contact is consulted or not.

With regard to knowing about the contact, this factor is closely associated with the fact that they are online social networks, since the participants referred to the information available for consultation in the contacts' profiles regarding their interests and hobbies. This possibility is not usually available in other non-virtual social networks, and for this reason, it obviously did not show up in the research carried out by Borgatti and Cross (2003).

The factor referred to as "social closeness" is clearly associated with what the contact represents in terms of social capital. According to the students, the closer a contact socially, the greater the possibility of consulting that contact. In other words, it is easier to consult a best friend than another student that they hardly know. This led us to consider the option of eliminating this factor, because accessibility as a factor might perhaps behave in a very similar way. In other words, the closer a person is socially, the greater the access to that person. However, when account is taken of the fact that some contacts are very close socially (parents, for example) yet are not accessible, a decision was taken to retain it as a distinctive factor.

## Conclusion

Lecturers and anyone interested in sharing their knowledge on online social networks should be aware of the factors affecting whether university students choose to use them as an information repository in a learning initiative. It is not sufficient for a lecturer to register on a social networking site and make contact, through the network, with the students. According to the theory of connectivism, contacts are a necessary rather than sufficient condition for learning to be promoted. In addition, a lecturer is required to gain the trust of the students. According to the results of this research, in addition to being connected, trust is gained by sharing information about oneself, by being prepared to answer when asked a question, by having a certain standing with regard to expertise in an area of knowledge, and by getting socially closer to contacts. Apparently, by being on the contact list of a university student and working on these factors, the chances of getting these students to use a lecturer as an information repository are increased.

Returning to the informal axiom proposed by Siemens, "I store my knowledge in my friends", it seems that the possibility of this happening depends firstly on carefully selecting the contacts that are added to a network. That is to say, as more trusted contacts are added, the likelihood of using them as information repositories is increased. However, even when the contacts are not well selected, the likelihood of using them as information repositories may be increased if the factors described in this paper are developed in order to raise the level of trust.

In short, the probability of using a contact as an information repository on an online social network depends as much on the careful selection of contacts as it does on the capacity of these contacts to earn our trust.

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